

## SEQUENZPROTOKOLL

&lt;110&gt; BASF Aktiengesellschaft

&lt;120&gt; Dihydroorotase aus Pflanzen

&lt;130&gt; O.Z. 0050/50716

&lt;140&gt; DE 199 42 742.9

&lt;141&gt; 1999-09-07

&lt;160&gt; 4

&lt;170&gt; PatentIn Vers. 2.0

&lt;210&gt; 1

&lt;211&gt; 1271

&lt;212&gt; DNA

&lt;213&gt; Solanum tuberosum

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (9)..(1046)

&lt;400&gt; 1

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	Met	Glu	Leu	Ser	Ile	Thr	Gln	Pro	Asp	Asp	Trp	His	Leu	His	
	1					5					10				

ctc	cgt	gat	ggt	gat	gtt	ctt	aag	gca	gtt	gtc	tct	cac	agt	gca	cat	98
Leu	Arg	Asp	Gly	Asp	Val	Leu	Lys	Ala	Val	Val	Ser	His	Ser	Ala	His	
15					20					25					30	

cac	ttt	ggg	agg	gca	ata	gtc	atg	cca	aat	ttg	aag	cct	cct	atc	act	146
His	Phe	Gly	Arg	Ala	Ile	Val	Met	Pro	Asn	Leu	Lys	Pro	Pro	Ile	Thr	
				35				40						45		

acc	act	gct	gct	gct	gta	gca	tac	cgg	gag	gcg	ata	ttg	aaa	tct	tta	194
Thr	Thr	Ala	Ala	Ala	Val	Ala	Tyr	Arg	Glu	Ala	Ile	Leu	Lys	Ser	Leu	
		50						55						60		

cct	gtt	gat	agt	gat	ttc	aac	cct	ctt	atg	aca	ctt	tat	ttg	aca	gat	242
Pro	Val	Asp	Ser	Asp	Phe	Asn	Pro	Leu	Met	Thr	Leu	Tyr	Leu	Thr	Asp	
		65					70						75			

aca	acc	agt	cct	atg	gaa	atc	aaa	cta	gca	aga	gag	agc	cag	gtc	gta	290
Thr	Thr	Ser	Pro	Met	Glu	Ile	Lys	Leu	Ala	Arg	Glu	Ser	Gln	Val	Val	
		80					85							90		

ttt ggg gtg aag ttg tac cct gct ggt gcc acg aca aat tct caa gat	338
Phe Gly Val Lys Leu Tyr Pro Ala Gly Ala Thr Thr Asn Ser Gln Asp	
95 100 105 110	
gga gtg act gat ctt ttc ggg aag tgt tta cca gtt cta caa gaa atg	386
Gly Val Thr Asp Leu Phe Gly Lys Cys Leu Pro Val Leu Gln Glu Met	
115 120 125	
gtt gag cat aat atg cct ctg ctg gtt cat gga gag gtt act aat cct	434
Val Glu His Asn Met Pro Leu Leu Val His Gly Glu Val Thr Asn Pro	
130 135 140	
gag gtt gac atg ttt gat aga gaa aag gta ttc att gaa acg gtt cta	482
Glu Val Asp Met Phe Asp Arg Glu Lys Val Phe Ile Glu Thr Val Leu	
145 150 155	
aga ccg ttg gtg cag aaa ttt cca caa ttg aag gtc gtg atg gag cat	530
Arg Pro Leu Val Gln Lys Phe Pro Gln Leu Lys Val Val Met Glu His	
160 165 170	
gtt acc acc att gat gct gtt aag ttt gtt gaa tct tgc act gaa gga	578
Val Thr Thr Ile Asp Ala Val Lys Phe Val Glu Ser Cys Thr Glu Gly	
175 180 185 190	
ttt gtt gca gca act gtc acc cca caa cat ctt gtt ttg aac agg aat	626
Phe Val Ala Ala Thr Val Thr Pro Gln His Leu Val Leu Asn Arg Asn	
195 200 205	
tct ctc ttc caa ggg ggc tta caa ccg cat aat tac tgc ctt cca gtc	674
Ser Leu Phe Gln Gly Gly Leu Gln Pro His Asn Tyr Cys Leu Pro Val	
210 215 220	
ctc aaa aga gag atc cac agg gag gca ctt gtg tca gct gta aca agt	722
Leu Lys Arg Glu Ile His Arg Glu Ala Leu Val Ser Ala Val Thr Ser	
225 230 235	
gga agt aaa aga ttt ttt ctt ggg act gat agt gct cct cat gat aga	770
Gly Ser Lys Arg Phe Phe Leu Gly Thr Asp Ser Ala Pro His Asp Arg	
240 245 250	
cga aga aaa gag tgt tct tgt gga tgt gct ggt att tac aat gca cct	818
Arg Arg Lys Glu Cys Ser Cys Gly Cys Ala Gly Ile Tyr Asn Ala Pro	
255 260 265 270	
gta gcc ttg tca gta tat gcg aag gtg ttt gaa aag gaa aat gca ctc	866
Val Ala Leu Ser Val Tyr Ala Lys Val Phe Glu Lys Glu Asn Ala Leu	
275 280 285	

gac aag ctt gaa gca ttc act agc ttc aat gga cca gat ttt tat ggg 914  
 Asp Lys Leu Glu Ala Phe Thr Ser Phe Asn Gly Pro Asp Phe Tyr Gly  
 290 295 300

ctt cct agg aac aac tca aag att aag ttg agt aag acg cca tgg aag 962  
 Leu Pro Arg Asn Asn Ser Lys Ile Lys Leu Ser Lys Thr Pro Trp Lys  
 305 310 315

gta ccc gaa tcc ttt tct tat gca tca gga gat att att ccc atg ttt 1010  
 Val Pro Glu Ser Phe Ser Tyr Ala Ser Gly Asp Ile Ile Pro Met Phe  
 320 325 330

gct ggt gaa atg ctc gac tgg ttg ccg gct cct ctc tgagaatcat 1056  
 Ala Gly Glu Met Leu Asp Trp Leu Pro Ala Pro Leu  
 335 340 345

ttgtcattct tgtactgtaa tattgtgatt caaccaaaga tatagactgt aggtgtatca 1116  
 tcttttcttt catgttgatt agatattatc acgatgataa tctcctttca gctaataaat 1176  
 tatggaaaca ataagctttg cacgctcacc aaagtgctcc tgtattctga agttcttaaa 1236  
 ttgttcgttt gattttgaag atttactgat aaaaa 1271

&lt;210&gt; 2

&lt;211&gt; 346

&lt;212&gt; PRT

&lt;213&gt; Solanum tuberosum

&lt;400&gt; 2

Met Glu Leu Ser Ile Thr Gln Pro Asp Asp Trp His Leu His Leu Arg  
 1 5 10 15

Asp Gly Asp Val Leu Lys Ala Val Val Ser His Ser Ala His His Phe  
 20 25 30

Gly Arg Ala Ile Val Met Pro Asn Leu Lys Pro Pro Ile Thr Thr Thr  
 35 40 45

Ala Ala Ala Val Ala Tyr Arg Glu Ala Ile Leu Lys Ser Leu Pro Val  
 50 55 60

Asp Ser Asp Phe Asn Pro Leu Met Thr Leu Tyr Leu Thr Asp Thr Thr  
 65 70 75 80

Ser Pro Met Glu Ile Lys Leu Ala Arg Glu Ser Gln Val Val Phe Gly

	85		90		95
Val Lys Leu Tyr Pro Ala Gly Ala Thr Thr Asn Ser Gln Asp Gly Val	100		105		110
Thr Asp Leu Phe Gly Lys Cys Leu Pro Val Leu Gln Glu Met Val Glu	115		120		125
His Asn Met Pro Leu Leu Val His Gly Glu Val Thr Asn Pro Glu Val	130		135		140
Asp Met Phe Asp Arg Glu Lys Val Phe Ile Glu Thr Val Leu Arg Pro	145		150		155
Leu Val Gln Lys Phe Pro Gln Leu Lys Val Val Met Glu His Val Thr	165		170		175
Thr Ile Asp Ala Val Lys Phe Val Glu Ser Cys Thr Glu Gly Phe Val	180		185		190
Ala Ala Thr Val Thr Pro Gln His Leu Val Leu Asn Arg Asn Ser Leu	195		200		205
Phe Gln Gly Gly Leu Gln Pro His Asn Tyr Cys Leu Pro Val Leu Lys	210		215		220
Arg Glu Ile His Arg Glu Ala Leu Val Ser Ala Val Thr Ser Gly Ser	225		230		235
Lys Arg Phe Phe Leu Gly Thr Asp Ser Ala Pro His Asp Arg Arg Arg	245		250		255
Lys Glu Cys Ser Cys Gly Cys Ala Gly Ile Tyr Asn Ala Pro Val Ala	260		265		270
Leu Ser Val Tyr Ala Lys Val Phe Glu Lys Glu Asn Ala Leu Asp Lys	275		280		285
Leu Glu Ala Phe Thr Ser Phe Asn Gly Pro Asp Phe Tyr Gly Leu Pro	290		295		300
Arg Asn Asn Ser Lys Ile Lys Leu Ser Lys Thr Pro Trp Lys Val Pro	305		310		315
Glu Ser Phe Ser Tyr Ala Ser Gly Asp Ile Ile Pro Met Phe Ala Gly	325		330		335
Glu Met Leu Asp Trp Leu Pro Ala Pro Leu					

340

345

&lt;210&gt; 3

&lt;211&gt; 1962

&lt;212&gt; DNA

&lt;213&gt; Nicotiana tabacum

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (305)..(1678)

&lt;400&gt; 3

gaattcggca cgagcacaaa agtagaaagg gttttgctct cccctttcat ctgtgtctca 60

taactgtgct aaaacctctc ccattctccc tcaagaacaa agccacccca aaacaccacc 120

ttgtacactc ccattgtcgc ttccagtttt gtgccccaaa taaccttttc agtcatttgt 180

atcttagcat caacaacagt tgctgtctct cttttgttcg tccaatatac tgagcatttt 240

ttgagtagta atttgaaggg tttattcagt tgtaaatat ttgatttttg ttttgtttaa 300

gaaa atg aga caa agg gtt gga ttt gca ttg att aga gaa agc ttg tat 349

Met Arg Gln Arg Val Gly Phe Ala Leu Ile Arg Glu Ser Leu Tyr

1

5

10

15

cgt aag cta aaa cca agc tct gtt ccc aga cat tat tgc act tct tct 397

Arg Lys Leu Lys Pro Ser Ser Val Pro Arg His Tyr Cys Thr Ser Ser

20

25

30

tca gct aat gtt cct cct att cct cca cct aag att cct cat tct tct 445

Ser Ala Asn Val Pro Pro Ile Pro Pro Pro Lys Ile Pro His Ser Ser

35

40

45

aaa aag gga agg ttg ttt aca gga gcc act att ggt cta cta ata gct 493

Lys Lys Gly Arg Leu Phe Thr Gly Ala Thr Ile Gly Leu Leu Ile Ala

50

55

60

ggg gga gct tat gca agt acg gtt gat gag gcc acc ttc tgt ggc tgg 541

Gly Gly Ala Tyr Ala Ser Thr Val Asp Glu Ala Thr Phe Cys Gly Trp

65

70

75

cta ttc tca gca aca aaa cta gta aat ccg ttc ttt gca ttt ctg gat 589

Leu Phe Ser Ala Thr Lys Leu Val Asn Pro Phe Phe Ala Phe Leu Asp

80

85

90

95

cca gag gtt gct cac aaa ctg gcg gtc tct gct gca gcc cga gga tgg 637

Pro	Glu	Val	Ala	His	Lys	Leu	Ala	Val	Ser	Ala	Ala	Ala	Arg	Gly	Trp	
				100					105					110		
gtt	cca	agg	gag	aag	agg	cca	gat	cct	cct	ata	ttg	ggc	ctt	gat	gtg	685
Val	Pro	Arg	Glu	Lys	Arg	Pro	Asp	Pro	Pro	Ile	Leu	Gly	Leu	Asp	Val	
			115				120					125				
tg	gga	aga	agg	ttc	tca	aat	cct	gtt	ggt	ctt	gct	gct	ggt	ttt	gac	733
Trp	Gly	Arg	Arg	Phe	Ser	Asn	Pro	Val	Gly	Leu	Ala	Ala	Gly	Phe	Asp	
		130					135				140					
aag	aat	gct	gag	gct	gtt	gaa	gga	ttg	ctt	gga	tta	ggt	ttt	ggc	ttt	781
Lys	Asn	Ala	Glu	Ala	Val	Glu	Gly	Leu	Leu	Gly	Leu	Gly	Phe	Gly	Phe	
	145					150				155						
gtt	gag	gtt	ggc	tca	gta	act	ccc	att	cca	cag	gaa	ggc	aac	cca	aaa	829
Val	Glu	Val	Gly	Ser	Val	Thr	Pro	Ile	Pro	Gln	Glu	Gly	Asn	Pro	Lys	
160				165					170						175	
cca	cgt	ata	ttt	agg	ttg	cca	aat	gaa	ggt	gct	ata	ata	aat	agg	tgt	877
Pro	Arg	Ile	Phe	Arg	Leu	Pro	Asn	Glu	Gly	Ala	Ile	Ile	Asn	Arg	Cys	
			180					185					190			
ggc	ttc	aat	agt	gaa	gga	atc	gtt	gtg	gtt	gcc	aaa	cga	ttg	ggt	gct	925
Gly	Phe	Asn	Ser	Glu	Gly	Ile	Val	Val	Val	Ala	Lys	Arg	Leu	Gly	Ala	
		195					200					205				
cag	cat	ggt	aag	aga	aag	ttg	gaa	aca	tct	agt	act	tca	tct	cca	gct	973
Gln	His	Gly	Lys	Arg	Lys	Leu	Glu	Thr	Ser	Ser	Thr	Ser	Ser	Pro	Ala	
	210					215					220					
gga	gat	gaa	gtc	aag	cat	gga	ggg	aaa	gct	ggt	cct	ggt	att	ctt	ggt	1021
Gly	Asp	Glu	Val	Lys	His	Gly	Gly	Lys	Ala	Gly	Pro	Gly	Ile	Leu	Gly	
	225					230				235						
gtt	aac	ctt	gga	aag	aat	aaa	aca	agt	gaa	gac	gct	gca	gca	gat	tat	1069
Val	Asn	Leu	Gly	Lys	Asn	Lys	Thr	Ser	Glu	Asp	Ala	Ala	Ala	Asp	Tyr	
240				245				250						255		
gtg	caa	gga	gtc	cat	aca	tta	tct	cag	tat	gct	gac	tac	ttg	gta	att	1117
Val	Gln	Gly	Val	His	Thr	Leu	Ser	Gln	Tyr	Ala	Asp	Tyr	Leu	Val	Ile	
			260					265					270			
aat	atc	tca	tcc	cca	aat	act	cca	gga	cta	cgc	cag	ctt	cag	gga	aga	1165
Asn	Ile	Ser	Ser	Pro	Asn	Thr	Pro	Gly	Leu	Arg	Gln	Leu	Gln	Gly	Arg	
		275						280				285				
aag	cag	ttg	aag	gat	ctt	gtg	aag	aag	gtt	caa	gca	gct	cgt	gat	gaa	1213

Lys Gln Leu Lys Asp Leu Val Lys Lys Val Gln Ala Ala Arg Asp Glu  
 290 295 300  
 atg cag tgg ggt gag gaa gga cct ccg cct tta ctt gtg aaa att gct 1261  
 Met Gln Trp Gly Glu Glu Gly Pro Pro Pro Leu Leu Val Lys Ile Ala  
 305 310 315  
 cca gat ttg tct aaa caa gat ctt gaa gat att gca gtg gtg gct gtt 1309  
 Pro Asp Leu Ser Lys Gln Asp Leu Glu Asp Ile Ala Val Val Ala Val  
 320 325 330 335  
 gct ctt cgt gtg gat gga ctg att ata tca aat act act gtc caa aga 1357  
 Ala Leu Arg Val Asp Gly Leu Ile Ile Ser Asn Thr Thr Val Gln Arg  
 340 345 350  
 cca gat tcc ata agt caa aac cct gtg gct caa gag gct ggt ggc ttg 1405  
 Pro Asp Ser Ile Ser Gln Asn Pro Val Ala Gln Glu Ala Gly Gly Leu  
 355 360 365  
 agt ggg aag cca ctc ttt gac atg tca aca aat ata ctg aag gag atg 1453  
 Ser Gly Lys Pro Leu Phe Asp Met Ser Thr Asn Ile Leu Lys Glu Met  
 370 375 380  
 tac gtt ctg act aag gga agg att cct ctg att ggc act ggg ggt att 1501  
 Tyr Val Leu Thr Lys Gly Arg Ile Pro Leu Ile Gly Thr Gly Gly Ile  
 385 390 395  
 agc agt ggc gag gat gct tac aag aaa att cga gct ggt gcc act ctt 1549  
 Ser Ser Gly Glu Asp Ala Tyr Lys Lys Ile Arg Ala Gly Ala Thr Leu  
 400 405 410 415  
 gtt cag ctt tat aca gca ttt gca tat gga ggc cct gca ctt atc ccc 1597  
 Val Gln Leu Tyr Thr Ala Phe Ala Tyr Gly Gly Pro Ala Leu Ile Pro  
 420 425 430  
 gat ata aag gat gaa ctt gct cgt tgc tta gaa aag gat ggt tat aag 1645  
 Asp Ile Lys Asp Glu Leu Ala Arg Cys Leu Glu Lys Asp Gly Tyr Lys  
 435 440 445  
 tca atc agt gag gct gtt gga gca gac tgc aga tagtagtagt tgatatacta 1698  
 Ser Ile Ser Glu Ala Val Gly Ala Asp Cys Arg  
 450 455  
 aaccagtctt ttgagtttga ggggcagagc acatttttgc cacttataat aaatgatata 1758  
 tttatggttt cctcccatgt ggcgtcatat catttgcttc gtaatttggtg atgtcttccc 1818  
 aaatttttagc tgtttaggga ttactcgtgg caggtgaccc gtatttttga aatgtaatat 1878

aggaacgaaa ctttgtatgt ttggttgagt tttttcttga tatggaatta aatccacaca 1938

aaaaaaaaa aaaaaaaga attc

1962

<210> 4

<211> 458

<212> PRT

<213> Nicotiana tabacum

<400> 4

Met Arg Gln Arg Val Gly Phe Ala Leu Ile Arg Glu Ser Leu Tyr Arg  
1 5 10 15

Lys Leu Lys Pro Ser Ser Val Pro Arg His Tyr Cys Thr Ser Ser Ser  
20 25 30

Ala Asn Val Pro Pro Ile Pro Pro Pro Lys Ile Pro His Ser Ser Lys  
35 40 45

Lys Gly Arg Leu Phe Thr Gly Ala Thr Ile Gly Leu Leu Ile Ala Gly  
50 55 60

Gly Ala Tyr Ala Ser Thr Val Asp Glu Ala Thr Phe Cys Gly Trp Leu  
65 70 75 80

Phe Ser Ala Thr Lys Leu Val Asn Pro Phe Phe Ala Phe Leu Asp Pro  
85 90 95

Glu Val Ala His Lys Leu Ala Val Ser Ala Ala Ala Arg Gly Trp Val  
100 105 110

Pro Arg Glu Lys Arg Pro Asp Pro Pro Ile Leu Gly Leu Asp Val Trp  
115 120 125

Gly Arg Arg Phe Ser Asn Pro Val Gly Leu Ala Ala Gly Phe Asp Lys  
130 135 140

Asn Ala Glu Ala Val Glu Gly Leu Leu Gly Leu Gly Phe Gly Phe Val  
145 150 155 160

Glu Val Gly Ser Val Thr Pro Ile Pro Gln Glu Gly Asn Pro Lys Pro  
165 170 175

Arg Ile Phe Arg Leu Pro Asn Glu Gly Ala Ile Ile Asn Arg Cys Gly  
180 185 190



Phe Asn Ser Glu Gly Ile Val Val Val Ala Lys Arg Leu Gly Ala Gln  
 195 200 205

His Gly Lys Arg Lys Leu Glu Thr Ser Ser Thr Ser Ser Pro Ala Gly  
 210 215 220

Asp Glu Val Lys His Gly Gly Lys Ala Gly Pro Gly Ile Leu Gly Val  
 225 230 235 240

Asn Leu Gly Lys Asn Lys Thr Ser Glu Asp Ala Ala Ala Asp Tyr Val  
 245 250 255

Gln Gly Val His Thr Leu Ser Gln Tyr Ala Asp Tyr Leu Val Ile Asn  
 260 265 270

Ile Ser Ser Pro Asn Thr Pro Gly Leu Arg Gln Leu Gln Gly Arg Lys  
 275 280 285

Gln Leu Lys Asp Leu Val Lys Lys Val Gln Ala Ala Arg Asp Glu Met  
 290 295 300

Gln Trp Gly Glu Glu Gly Pro Pro Pro Leu Leu Val Lys Ile Ala Pro  
 305 310 315 320

Asp Leu Ser Lys Gln Asp Leu Glu Asp Ile Ala Val Val Ala Val Ala  
 325 330 335

Leu Arg Val Asp Gly Leu Ile Ile Ser Asn Thr Thr Val Gln Arg Pro  
 340 345 350

Asp Ser Ile Ser Gln Asn Pro Val Ala Gln Glu Ala Gly Gly Leu Ser  
 355 360 365

Gly Lys Pro Leu Phe Asp Met Ser Thr Asn Ile Leu Lys Glu Met Tyr  
 370 375 380

Val Leu Thr Lys Gly Arg Ile Pro Leu Ile Gly Thr Gly Gly Ile Ser  
 385 390 395 400

Ser Gly Glu Asp Ala Tyr Lys Lys Ile Arg Ala Gly Ala Thr Leu Val  
 405 410 415

Gln Leu Tyr Thr Ala Phe Ala Tyr Gly Gly Pro Ala Leu Ile Pro Asp  
 420 425 430

Ile Lys Asp Glu Leu Ala Arg Cys Leu Glu Lys Asp Gly Tyr Lys Ser  
 435 440 445

Ile Ser, Glu Ala Val Gly Ala Asp Cys Arg  
450 455